

# TTI Suggested ISO Codes

TTI's suggestions are dependent upon system size and contaminant levels. Achieving and maintaining these suggested ISO codes may require the use of a prescribed cleanliness program.

| System Component             | TTI Suggested        | Industry Standard | TTI Suggested               | Industry Standard | TTI Suggested        | Industry Standard |
|------------------------------|----------------------|-------------------|-----------------------------|-------------------|----------------------|-------------------|
|                              | < 2000 psi (138 bar) |                   | 2000-3000 psi (138-207 bar) |                   | > 3000 psi (207 bar) |                   |
| <b>Pumps</b>                 |                      |                   |                             |                   |                      |                   |
| Variable Vane                | ≤ 16/14/11           | 18/16/13          | ≤ 15/13/10                  | 17/15/12          | -                    | -                 |
| Variable Piston              | ≤ 16/14/11           | 18/16/13          | ≤ 15/13/10                  | 17/15/12          | ≤ 15/13/10           | 17/15/12          |
| Fixed Vane                   | ≤ 17/15/12           | 20/18/15          | ≤ 16/14/11                  | 19/17/14          | ≤ 15/13/10           | 18/16/13          |
| Fixed Piston                 | ≤ 16/14/11           | 19/17/14          | ≤ 15/13/10                  | 18/16/13          | ≤ 15/13/10           | 17/15/12          |
| Fixed Gear                   | ≤ 17/15/12           | 20/18/15          | ≤ 16/14/11                  | 19/17/15          | -                    | -                 |
| <b>Valves</b>                |                      |                   |                             |                   |                      |                   |
| Servo Valve                  | ≤ 14/12/9            | 16/14/11          | ≤ 14/12/9                   | 16/14/11          | ≤ 13/11/8            | 15/13/10          |
| Proportional Pressure        | ≤ 15/13/10           | 17/15/12          | ≤ 15/13/10                  | 17/15/12          | ≤ 14/12/9            | 16/14/11          |
| Proportional Flow            | ≤ 15/13/10           | 17/15/12          | ≤ 15/13/10                  | 17/15/12          | ≤ 14/12/9            | 16/14/11          |
| Proportional Directional     | ≤ 15/13/10           | 17/15/12          | ≤ 15/13/10                  | 17/15/12          | ≤ 14/12/9            | 16/14/11          |
| Proportional Cartridge Valve | ≤ 15/13/10           | 17/15/12          | ≤ 15/13/10                  | 17/15/12          | ≤ 14/12/9            | 16/14/11          |
| Pressure Control Modulating  | ≤ 17/15/12           | 19/17/14          | ≤ 16/14/11                  | 18/16/13          | ≤ 15/13/10           | 17/15/12          |
| Flow Control                 | ≤ 17/15/12           | 19/17/14          | ≤ 16/14/11                  | 18/16/13          | ≤ 16/14/11           | 18/16/13          |
| Directional Solenoid         | ≤ 17/15/12           | 20/18/15          | ≤ 16/14/11                  | 19/17/14          | ≤ 15/13/10           | 18/16/13          |
| Check Valve                  | ≤ 17/15/12           | 20/18/15          | ≤ 17/15/12                  | 20/18/15          | ≤ 16/14/11           | 19/17/14          |
| Cartridge                    | ≤ 16/14/11           | 18/16/13          | ≤ 15/13/10                  | 17/15/12          | ≤ 15/13/10           | 17/15/12          |

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| <b>Actuators</b>             |                      |                   |                             |                   |                      |                   |
| Radial Piston Motors         | ≤ 16/14/11           | 17/15/12          | ≤ 15/13/10                  | 16/14/11          | ≤ 15/13/10           | 15/13/10          |
| Gear Motors                  | ≤ 17/15/12           | 20/18/15          | ≤ 16/14/11                  | 19/17/14          | ≤ 15/13/10           | 18/16/13          |
| Axial Piston Motors          | ≤ 16/14/11           | 19/17/14          | ≤ 15/13/10                  | 18/16/13          | ≤ 15/13/10           | 17/15/12          |
| Vane Motors                  | ≤ 17/15/12           | 20/18/14          | ≤ 16/14/11                  | 19/17/13          | ≤ 15/13/10           | 18/16/13          |
| Cylinders                    | ≤ 17/15/12           | 20/18/15          | ≤ 16/14/11                  | 19/17/14          | ≤ 15/13/10           | 18/16/13          |
| <b>Bearings</b>              |                      |                   |                             |                   |                      |                   |
| Ball Bearing                 | ≤ 14/12/9            | 15/13/10          |                             |                   |                      |                   |
| Gearbox (industrial)         | ≤ 16/14/11           | 17/16/13          |                             |                   |                      |                   |
| Journal Bearing (high speed) | ≤ 16/14/11           | 17/15/12          |                             |                   |                      |                   |
| Journal Bearing (low speed)  | ≤ 16/14/11           | 17/15/12          |                             |                   |                      |                   |
| Roller Bearing               | ≤ 15/13/10           | 16/14/11          |                             |                   |                      |                   |
| <b>Other</b>                 |                      |                   |                             |                   |                      |                   |
| HP Fuel Injector             | ≤ 15/13/10           | 16/14/11          | ≤ 15/13/10                  | 16/14/11          | ≤ 15/13/10           | 16/14/11          |
| Hydrostatic Transmission     | ≤ 16/14/11           | 17/15/13          | ≤ 15/13/10                  | 16/1/11           | ≤ 15/13/10           | 16/14/11          |
| Test Stands                  | ≤ 16/14/11           | 18/16/13          | ≤ 15/13/10                  | 18/16/13          | ≤ 15/13/10           | 18/16/13          |

Need help getting your, or your customer's system to TTI's suggested ISO cleanliness codes? Then reach out to us today to learn more about our PowerGuard™ line of elements and spin-on filters. TTI, the fastest, friendliest, and highest quality, total system cleanliness provider.